CLAIMS

What is claimed is:

1. In a computer controlled graphics display system, a method of displaying a polygon data structure on a display screen, said method comprising the steps of:

(a) accessing a user originated speed/quality setting;

(b) determining whether to render said polygon using either linear or perspective texture mapping procedures based on (1) a perspective orientation of said polygon and based on (2) the size of said polygon, said step (b) adjusted based on said speed/quality setting;

(c) splitting said polygon into at least two triangles based on said perspective orientation of said polygon, said step (c) adjusted based on said speed/quality setting;

(d) splitting said polygon into at least two triangles based on said size of said polygon, said step (d) adjusted based on said speed/quality setting;

(e) performing a plurality of graphics processes using fixed point or floating point computations based on a plurality of thresholds and said speed/quality setting, each of said plurality of thresholds independently adjusted by said speed/quality setting; and

(f) rendering said polygon, or subdivisions thereof, on a display screen, said step (f) comprising the step of texture mapping said polygon, or subdivisions thereof, using a linear interpolation driven texture mapping procedure.

2. A method as described in Claim 1 wherein said step (b) comprises the steps of:

(b1) determining to render said polygon using linear texture mapping procedures provided a maximum height of said polygon is less than a first

height threshold and a maximum width of said polygon is less than a first width threshold; and

(b2) determining to render said polygon using linear texture mapping procedures provided said perspective orientation of said polygon is less than a first perspective threshold; and

(b3) determining to render said polygon using perspective texture mapping procedures provided said polygon is not otherwise determined to be rendered using linear texture mapping procedures by step (b1) or by step (b2) above.

3. A method as described in Claim 1 wherein step (c) comprises the steps of:

(c1) determining perspective ratios for each pair of adjacent vertices of at least three vertices of said polygon; and

(c2) subdividing said polygon to generate a plurality of new polygons provided any of said perspective ratios exceeds a second perspective threshold.

4. A method as described in Claim 1 wherein said step (d) comprises the steps of:

(d1) splitting said polygon along its height, into two triangles, provided a maximum height of said polygon exceeds a second height threshold;

(d2) splitting said polygon along its width, into two triangles, provided a maximum width of said polygon exceeds a second width threshold; and

(d3) splitting said polygon into two triangles provided an ortho span of said polygon exceeds an ortho size threshold.

5. A method as described in Claim 1 wherein said step (e) comprises the steps of:

performing fixed point parameterizations effecting the geometry of said polygon provided said speed/quality setting is less than a geometry threshold, otherwise performing floating point parameterizations;

performing fixed point Z-buffer computations provided said speed/quality setting is less than a Z-buffer threshold, otherwise performing floating point Z-buffer computations;

performing fixed point alpha blending computations provided said speed/quality setting is less than an alpha blending threshold, otherwise performing floating point alpha blending computations; and

performing fixed point gouraud shading computations provided said speed/quality setting is less than a gouraud shading threshold, otherwise performing floating point gouraud shading computations.

6. In a computer controlled graphics display system, a method of displaying a polygon data structure on a display screen, said method comprising the steps of:

(a) accessing a user originated speed/quality setting;

(b) determining whether to render said polygon using either linear or perspective texture mapping procedures based on (1) a perspective orientation of said polygon and a first perspective threshold and based on (2) a size of said polygon and a first size threshold, said step (b) adjusted based on said speed/quality setting;

(c) splitting said polygon into at least two triangles based on said perspective orientation of said polygon and a second perspective threshold, said step (c) adjusted based on said speed/quality setting;

(d) splitting said polygon into at least two triangles based on said size of said polygon and a second size threshold, said step (d) adjusted based on said speed/quality setting;

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(e) performing a plurality of graphics processes using fixed point or floating point computations based on a plurality of thresholds and said speed/quality setting, each of said plurality of thresholds independently adjusted by said speed/quality setting; and

(f) rendering said polygon, or subdivisions thereof, on a display screen, said step (f) comprising the step of texture mapping said polygon, or subdivisions thereof, using a texture mapping procedure as determined by said step (b).

7. A method as described in Claim 6 wherein said first size threshold comprises a first height threshold and a first width threshold and wherein said step (b) comprises the steps of:

(b1) determining to render said polygon using linear texture mapping procedures provided a maximum height of said polygon is less than said first height threshold and a maximum width of said polygon is less than said first width threshold; and

(b2) determining to render said polygon using linear texture mapping procedures provided said perspective orientation of said polygon is less than said first perspective threshold; and

(b3) determining to render said polygon using perspective texture mapping procedures provided said polygon is not otherwise determined to be rendered using linear texture mapping procedures by step (b1) or by step (b2) above.

8. A method as described in Claim 6 wherein step (c) comprises the steps of:

(c1) determining perspective ratios for each pair of adjacent vertices of at least three vertices of said polygon; and

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(c2) subdividing said polygon to generate a plurality of new polygons provided any of said perspective ratios exceeds said second perspective threshold.

9. A method as described in Claim 8 wherein said step (c2) comprises the steps of:

dividing said polygon into four new triangles provided three edges of said polygon have perspective ratios exceeding said second perspective threshold;

dividing said polygon into three new triangles provided only two edges of said polygon have perspective ratios exceeding said second perspective threshold; and

dividing said polygon into two new triangles provided only one edge of said polygon has a perspective ratio exceeding said second perspective threshold.

10. A method as described in Claim 6 wherein said second size threshold comprises a second height threshold, a second width threshold and an ortho size threshold and wherein said step (d) comprises the steps of:

(d1) splitting said polygon along its height, into two triangles, provided a maximum height of said polygon exceeds said second height threshold;

(d2) splitting said polygon along its width, into two triangles, provided a maximum width of said polygon exceeds said second width threshold; and

(d3) splitting said polygon into two triangles provided an ortho span of said polygon exceeds said ortho size threshold.

11. A method as described in Claim 6 wherein said step (e) comprises the steps of:

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performing fixed point parameterizations effecting the geometry of said polygon provided said speed/quality setting is less than a geometry threshold, otherwise performing floating point parameterizations;

performing fixed point Z-buffer computations provided said speed/quality setting is less than a Z-buffer threshold, otherwise performing floating point Z-buffer computations;

performing fixed point alpha blending computations provided said speed/quality setting is less than an alpha blending threshold, otherwise performing floating point alpha blending computations; and

performing fixed point gouraud shading computations provided said speed/quality setting is less than a gouraud shading threshold, otherwise performing floating point gouraud shading computations.

12. A method as described in Claim 6 wherein said step (f) comprises the step of performing fixed point texture mapping computations provided said speed/quality setting is less than a texture map threshold, otherwise performing floating point texture mapping computations.

13. A method as described in Claim 6 further comprising the steps of:

reducing said first perspective threshold and said first size threshold as said speed/quality setting increases and increasing said first perspective threshold and said first size threshold as said speed/quality setting decreases;

reducing said second perspective threshold as said speed/quality setting increases and increasing said second perspective threshold as said speed/quality setting decreases; and

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reducing said second size threshold as said speed/quality setting increases and increasing said second size threshold as said speed/quality setting decreases.

14. In a computer controlled graphics display system having a processor coupled to bus, a graphics subsystem coupled to said bus, a display coupled to said bus, and a computer readable memory unit coupled to said bus and storing instructions therein that when executed causing said system to implement a method for displaying a polygon on said display, said method comprising the steps of:

(a) accessing a user originated speed/quality setting;

(b) determining whether to render said polygon using either linear or perspective texture mapping procedures based on (1) a perspective orientation of said polygon and a first perspective threshold and based on (2) a size of said polygon and a first size threshold, said step (b) adjusted based on said speed/quality setting;

(c) splitting said polygon into at least two triangles based on said perspective orientation of said polygon and a second perspective threshold, said step (c) adjusted based on said speed/quality setting;

(d) splitting said polygon into at least two triangles based on said size of said polygon and a second size threshold, said step (d) adjusted based on said speed/quality setting;

(e) performing a plurality of graphics processes using fixed point or floating point computations based on a plurality of thresholds and said speed/quality setting, each of said plurality of thresholds independently adjusted by said speed/quality setting; and

(f) rendering said polygon, or subdivisions thereof, on a display screen, said step (f) comprising the step of texture mapping said polygon, or

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subdivisions thereof, using a texture mapping procedure as determined by said step (b).

15. A computer readable memory unit as described in Claim 14 wherein said first size threshold comprises a first height threshold and a first width threshold and wherein said step (b) comprises the steps of:

(b1) determining to render said polygon using linear texture mapping procedures provided a maximum height of said polygon is less than said first height threshold and a maximum width of said polygon is less than said first width threshold; and

(b2) determining to render said polygon using linear texture mapping procedures provided said perspective orientation of said polygon is less than said first perspective threshold; and

(b3) determining to render said polygon using perspective texture mapping procedures provided said polygon is not otherwise determined to be rendered using linear texture mapping procedures by step (b1) or by step (b2) above.

16. A computer readable memory unit as described in Claim 14 wherein step (c) comprises the steps of:

(c1) determining perspective ratios for each pair of adjacent vertices of at least three vertices of said polygon; and

(c2) subdividing said polygon to generate a plurality of new polygons provided any of said perspective ratios exceeds said second perspective threshold.

17. A computer readable memory unit as described in Claim 16 wherein said step (c2) comprises the steps of:

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dividing said polygon into four new triangles provided three edges of said polygon have perspective ratios exceeding said second perspective threshold;

dividing said polygon into three new triangles provided only two edges of said polygon have perspective ratios exceeding said second perspective threshold; and

dividing said polygon into two new triangles provided only one edge of said polygon has a perspective ratio exceeding said second perspective threshold.

18. A computer readable memory unit as described in Claim 14 wherein said second size threshold comprises a second height threshold, a second width threshold and an ortho size threshold and wherein said step (d) comprises the steps of:

(d1) splitting said polygon along its height, into two triangles, provided a maximum height of said polygon exceeds said second height threshold;

(d2) splitting said polygon along its width, into two triangles, provided a maximum width of said polygon exceeds said second width threshold; and

(d3) splitting said polygon into two triangles provided an ortho span of said polygon exceeds said ortho size threshold.

19. A computer readable memory unit as described in Claim 14 wherein said step (e) comprises the steps of:

performing fixed point parameterizations effecting the geometry of said polygon provided said speed/quality setting is less than a geometry threshold, otherwise performing floating point parameterizations;

performing fixed point Z-buffer computations provided said speed/quality setting is less than a Z-buffer threshold, otherwise performing floating point Z-buffer computations;

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performing fixed point alpha blending computations provided said speed/quality setting is less than an alpha blending threshold, otherwise performing floating point alpha blending computations; and

performing fixed point gouraud shading computations provided said speed/quality setting is less than a gouraud shading threshold, otherwise performing floating point gouraud shading computations.

20. A computer readable memory unit as described in Claim 14 wherein said step (f) comprises the step of performing fixed point texture mapping computations provided said speed/quality setting is less than a texture map threshold, otherwise performing floating point texture mapping computations.

21. A computer readable memory unit as described in Claim 14 wherein said method further comprising the steps of:

reducing said first perspective threshold and said first size threshold as said speed/quality setting increases and increasing said first perspective threshold and said first size threshold as said speed/quality setting decreases;

reducing said second perspective threshold as said speed/quality setting increases and increasing said second perspective threshold as said speed/quality setting decreases; and

reducing said second size threshold as said speed/quality setting increases and increasing said second size threshold as said speed/quality setting decreases.

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